# COMMERCIAL FERTILIZERS

SOLD IN MISSISSIPPI DURING THE SPRING OF 1883.

By JOHN A. MYERS, Prof. of Chemistry, A. and M. College, Mississippi.

A. & M. COLLEGE OF MISSISSIPPI,) OCTOBER 1ST, 1883.

Maj. E. G. Wall, Commissioner of Agriculture, Jackson, Miss.:

DEAR SIR: According to promise, I send you herewith the Report of the State Chemist upon the Composition of the Commercial Fertilizers sold in Mississippi, together with other matter that may be of value to the farmers of the State. Respectfully,

IOHN A. MYERS, State Chemist.

The farmers of Mississippi will find in the State Chemist's Report much information of great value that may save them thousands of dollars in the purchase of Commercial Fertilizers. E. G. WALL, TACKSON, MISSISSIPPI, October 7th, 1883. Commissioner of Agriculture,

In making this Report of the Composition and Value of the Fertilizers, the State Chemist does not claim that it is complete. But the list embraces all brands sold in the State, so far as he is aware. There may still be a few brands offered for sale, but if so, they are not extensively sold, and the manufacturers have rendered themselves liable to heavy penalties.

This is the first year that any law regulating the sale of fertilizers has been put into operation in the State. We have heard of several brands being shipped out of the State since the law went into force, and we are not aware of any brands of "doubtful composition" now being sold in the State.

The sale of fertilizers in the State is much less than in some of our sister States, where the system of inspection is much more rigid than here. We are fully aware of the value of good fertilizers and we believe that their sale will be largely increased each year. But until a more rigid system of inspection is adopted, there is no very great security against fraud. A more rigid system, we are convinced, will be better for every one interested in

### TO DEALERS AND AGENTS.

You may rest assured that you will best serve your own interest by carefully studying the analyses of the different brands of Fertilizers offered for sale in the State, and selecting only those which, from their composition, are known to be of fair quality. It is to your interest to build up a business in which the farmers will have confidence. They may be induced to buy an indifferent article once or twice, but the effect of unfair dealing will fall, sooner or later, upon the guilty parties.

The prices adopted are high enough to permit you to have a fair margin upon the Fertilizers without charging the farmers higher prices than those assigned. We advise farmers not to pay more, as other brands can be had that will be just as good for these prices or less. We have been very liberal in our prices, and we wish to see the business extended as much as possible in

In past years, the trade has suffered very seriously by poor articles being offered at high prices, and the farmers thereby losing confidence in Commercial Fertilizers. This can only be overcome by time and strict honesty upon the part of dealers and

### TO MANUFACTURERS.

We have had a few complaints from you about the results of the analyses. It is our duty to determine the composition and value of the Fertilizers as found in the market in Mississippi. We employ the method of analysis that is generally adopted by the State Chemists in this country, for the determination of the value of Fertilizers. It is known as the "Washington Method," because adopted by the chemists who assembled there a few years since to agree upon some uniform method of analysis of Fertilizers. We are aware that it has its defects, but as long as it continues to be the method in general use, it is as fair for one manufacturer as for another. It may not give as large a percentage of phosphoric acid as some other methods, but if the Fertilizer is finely ground it gives the manufacturer a considerable advantage over the manufacturer of coarser preparations, especially in the case of bone phosphate.

By this method of analysis if the chemists for the fertilizer factories allow the citrate of ammonia to act for a longer time or at a higher temperature than has been agreed upon by the State Chemists, it dissolves more of the fine ground bone, and hence their result will show a greater per cent, of phosphoric acid than the State Chemists obtain. Complaints, therefore, based upon determinations made in this way or by any other modification of the adopted system, receive very little attention.

The determinations appear also to be disturbed by the presence of marl (carbonate of lime, etc.,) and cotton seed hull ashes. We have not had opportunity of determining exactly what the disturbing action is, but if the claims of some of our manufacturers are not incorrect, or if they have not made some mistake in their goods, it is considerable.

According to this system, all goods of the same class are treated exactly alike, which is as fair for one manufacturer as for another, We have used the following prices for the determination of the

value of the Ruliners.			
Available phosphoric acid (soluble and precipi-			
tated)	1235	cts.	per lb.
Nitrogen	25	cts.	per ib.
Potash	có	cts.	per lb.

We consider the soluble and precipitated phosphoric acid worth the same and allow the manufacturer nothing for the insoluble phosphoric acid present. We do not claim that the insoluble phosphoric acid is not available for plant food, or that it may not readily become so. We consider it of great value to the plant, especially under certain conditions, but in view of the liberal price allowed for the so-called available phosphoric acid, we neglect the insoluble in the calculation.

The nitrogen is determined as ammonia by the soda-lime process, except when nitrates are present, in which case the absolute process is employed.

The analyses given in the following table were made upon samples sent to the State Chemist, as required by law, by the manufacturers or their authorized agents, and the affidavits of the manufacturers declaring them to be fair samples of the goods as offered for sale in Mississippi, are on file in our Laboratory. They may be considered as fair as single samples could well represent large bulks of manufactured products.

We do not expect to find the amounts claimed by the manufacturers in every case, nor that they will always be satisfied with the results; but if they send us samples, selected according to our directions, we expect to obtain the correct results and values for the goods as represented by the sample sent, which will be pretty near their average value.

## TO FARMERS.

It appears to be generally conceded that the use of fertilizers in order to secure paying crops is now almost unavoidable in the South. The soil, from a long continued exhaustion by growing a single crop (cotton), is rapidly failing to respond to the demands made upon it. This failure is chiefly due to three causes:

1st. The continual demand made upon it by one kind of vegetation, which as fast as it ripened has been shipped out of the country, thus carrying away vast quantities of plant-food which has never been returned to the soil. In adopting this system of agriculture it becomes simply a question of time as to how long it can be pursued. The history of agriculture gives no example of a country that has adopted it, that has not sooner or later become impoverished. Those valleys that still retain their original

fertility have been replenished year after year by overflows. 2d. The continual exposure of the soil to the heat of the sun without permitting it to be shaded by vegetation or to accumulate organic matter from the decay of vegetable substances, rapidly

causes it to become nonproductive. 3d. Where cotton is properly cultivated, no other vegetation is permitted to grow. This exposes the greater portion of the country to the action of washing rains. This washing of the lands, with no vegetable matter in them to retain the soluble constituents of the soil, is rapidly carrying the cream of Mississippi lands into the Gulf of Mexico.

The difficulty suggests the remedy. We do not have space to discuss it fully. But the original fertility may be restored by bringing back what has been taken from the soil. Further exhaustion of the soil can be prevented by a change in the system, of agriculture. "Cotton is King." Yes, Cotton, if the soil produces less than half a bale to the acre, with the contingencies to which the crop is subject. The uncertainty of our labor system and the usury of our credit system, is king of bankruptcy, poverty and ruin. If cotton is the only thing that a Mississippi farmer will or can raise he must make less land produce more cotton. It is cheaper to fertilize so that one acre will produce half a bale, than it is to cultivate three acres in order to get a bale of cotton.

We have great confidence in fertilizers, and the richer they are

We have great confidence in fertilizers, and the richer they are the better. We advise no farmer to buy a low priced fertilizer, unless he is sure that it has a large percentage of phosphoric acid, ammonia or nitrogen and potash. It costs considerable to make a good fertilizer. While we advise farmers to use fertilizers extensively, we consider it cheaper for them to manufacture them themselves than to buy them from regular manufacturers. For example, we will suppose the farmer wishes to compost so as to have 2,000 lbs of fertilizer: He would have to buy his acid phosphate. He has his nitrogen in cotton seed meal, and his pot-ash in wood ashes, cotton seed hull ashes, or he can buy it in kainite or muriate of potash. Of course the more he buys the nearer the price of his fertilizer will approach to that of the com-Suppose that he wishes to use his stable manure and cotton

We appear that he was this formule:

Cotton seed meal ..... 

Nitrogen...... 21.5 lbs.x25 = Potash...... 8.4 lbs.x26 =

At prices charged for commercial fertilizers The cash cost of the fertilizer was \$18.75, while its value, it bought at the ruling figures, is \$25.67. The farmer has therefore saved \$6.72 per ton of 2000 pounds. In addition to this he has utilized what would otherwise be waste products of his farm.

This formula is given, simply as an example of the use that may be made of the valuation of the fertilizers. Your State Chemist would induce, if he could, every farmer in the State to try for two successive seasons the effect of either commercial fertilizers or composted materials upon his land. The profits of farming are in manures, and we are sorry to say that the greater portion of these profits is permitted to be wasted in Mississippi.

The materials at the command of the farmers are much more abundant than is supposed. We will mention barnyard manure, night soil, leaf-mould, swamp muck, shells, tobacco stems, pine straw, sugar house scum, wood ashes, cotton seed hull ashes, land plaster, marl, lime, cotton seed meal, cotton seed, bones, and especially the liquid manures from stables. There is scarcely a farmer in the State who cannot save at least \$100 worth of manures during the season, if he is disposed to do so.

### COMPOSTING.

This is a process with which too many of our farmers are wholly unacquainted. And where they are acquainted with the process, it is most generally neglected through carelessness or ignorance of its value. Composting is simply a method of securing all the waste vegetable matter about the farm, and mixing with everything of manurial value in such a way that the vegetable matter will be decomposed and the plant food that is locked up in it rendered available. The more perfectly this decomposition can be effected, with the least possible loss of fertilizing elements, the more satisfactory is the composting.

We suppose that a farmer has stable manure, chip manure,

leaf-mould, marl or land plaster, cotton seed or cotton seed meal, wood ashes, and various other fertilizing materials. He will be surprised at the quantity of this kind of matter he can collect upon his farm.

We think that in preference to using the conical compost heap usually recommended it is better to use a long ridge. The advantage of this arrangement is, that he can keep adding to one end of it and the "heating" when it begins will be more rapidly transmitted through the heap than when several separate cones

The composting should be done under a shed where it will be dry. The foundation of the heap should be scouped out so that all liquids will flow from the edges towards the center through which a drain should pass from one end to the other. Let the foundation be about 10 feet across and as long as the quantity of

materials may require.

Over the foundation he can scatter a layer of leaf-mould three inches thick; upon this about six inches of stable manure mixed with about 100 pounds of land plaster to the ton. In place of land plaster he may use marl or fresh earth or muck. Then comes his vegetable matter about 6 inches thick mixed with his ashes or lime. Then more stable manure, say six inches, upon which comes the same materials in order of succession, as before, until the whole has reached the desired height. Cover the whole about 2 inches deep with leaf-mould or fresh earth, or scatter land plaster over it, and allow to heat. If during the heating, ammonia can be detected in the vapors, fresh earth or land plaster should be added. After the heating has ceased, the heap should be turned over and rebuilt, adding more plaster if necessary. It will again heat. The trouble with the most of the composting is that they do not give it time to become complete. If considerable coarse vegetable matter is present it may take more than a year to become completely decomposed.

If it is desired to incorporate into this, acid phosphate, kainite or commercial fertilizers, it can be readily done by mixing these with the various ingredients as they are introduced into the compost heap. When the heap begins to heat, considerable liquid will usually drain from it. This can be poured back upon the top of the heap. If a compost heap is hauled out before it has had time for the completion of the operation, the farmer will be disappointed, and feel that he has not had returns for his time and labor. By keeping an account of the materials that he introduces into the heap he can tell what quantity to use per acre. The process presents no difficulties that the ordinary farmer cannot readily overcome, and is so simple that whether the directions here outlined are followed, or whether he adopts another method, he is pretty likely to be successful, if he will use enough of those substances which will prevent the ammonia from escaping and allow the heap to remain long enough to be completely decom-

In determining the value of fertilizers by their composition, it is not to be understood that we mean that they will always be worth that much to the farmer We mean that at the prices which certain standard fertilizers, as guano, kainite and acid phosphate command, the fertilizers are worth the prices indicated. They are relative values. The cheapest fertilizer at the command of the Southern farmer is cotton seed meal. Let it be fed to stock, and the stock sold for meat while the manure is kept upon the farm. Where there is not sufficient stock upon the farm, it is the cheapest material in the market for composting,

Farmers are often heard to say, if we only had clover in this country, we could do much better than we now do. That is possible. Clover can be grown in Mississippi and will do well; but the farmers of the South have another means of improving their land which, if they would only avail themselves of it, would be just as effective, and in the South is more certain than clover. I refer to the

A soil can scarcely be so completely exhausted that it will not grow. The summers never get so hot or the soil so dry that it will not give a fair crop. Its action upon the soil is exactly similar to that of clover. A field will always be the better of its having been grown upon it, even if it has been cut for hay and removed from the land. The roots penetrate deep into the soil and not only loosen it up and render the insoluble plant food more available, but the roots decaying there leave humous and nitrogenous matter which act as a splendid fertilizer for succeeding crops. If the chemists have made no mistake in their analyses, a good crop of cow peas plowed under when the peas are about half ripe is equal to an application of fifteen dollars worth of commercial fertilizers per acre. The calculation is based upon the supposition that the green vines would weigh four tons per acre, which is not an extraordinary crop, and have ten bushels of peas per acre in the pods. But even should there be but half of this estimated crop upon the land, it is clear that it is the cheapest fertilizer that can be produced upon the farm.

The cow pea, next to cotton-seed meal, is the richest feed produced in the South. The vines, when cut and properly cured, is one of the most valuable hay crops. The food is so rich that farmers will have to feed it with caution or it will kill the stock, as they are liable to eat too much of it before they become accustomed to it. This is especially the case where stock is turned into the field and allowed to graze upon the cow peas. We are convinced that this crop is as much of a boon to the Southern farmer as clover is to the Northern.

KAINITE. This is a fertilizer imported from Germany which bids fair to be of the greatest value to the Southern farmer. It has the following composition, which varies more or less:

	Sulphate of potash24.80	per	cent
	Sulphate of magnesia14.30	per	cent
	Chloride of magnesia	per	cent
	Chloride of sodium (common salt)31.00	per	cent
	Moisture14-36	per	cent
	Insoluble matter	_	
-	Total100 00		
		-	

It is, undoubtedly, a very valuable fertilizer, as is shown by careful experiments carried on at the various agricultural stations in Germany. In using it, it should be applied as long as possible before the planting of the seed. From 200 to 400 pounds to the acre, with or without phosphates, is recommended. It may also be composted with any kind of material used in composting and applied with the compost. It is thought to be almost a specific against rust in cotton. It has largely increased the yield of cotton, potatoes, beets and several garden vegetables. It is a cheap fer-tilizer and will be tound of special value upon light sandy soils and calcareous soils. The effect is not usually so marked upon

heavy clay lands.

The use of commercial fertilizers in those Southern States where there has been a strict system of inspection, has most generally been attended with great profit. There are few cases in which 300 pounds of good commercial fertilizers per acre have not increased the product from 50 to 200 per cent. The influence of the featilizers is usually more marked in sandy lands than in heavy clay

We think that the farmers will find the fertilizers at present offered for sale in the State to be of fair composition and not to vary widely from the certified value. It is highly probable that the commercial fertilizers are worth more when properly composted with farm manures. Their influence appears to be more marked, their ingredients are perhaps more easily assimilated and their power appears to be exerted for a longer time than when used alone. Whether this is true or not remains for the future to determine, but results appear in many cases to indicate it.

Respectfully submitted,

TOHN A. MYERS, State Chemist.

---OVER-LADER PRUIT TREES.

American Agriculturist.]

It is a rule in fruit culture, that a tree should not carry any greater weight of fruit than its branches cap analyse. Still, with some rapidly swelling fruits, peaches and plums capecially, however thoroughly thinning may have been done it is often found, as the fruit ripens, that the weight is too great, and the branches unless thay are supported, with break down with the load of fruit. The usual method of supporting overlades fruit trees is to place long stakes, with a fork at the top, beneath them. A much better and more simple method of effecting the purpose is suggested by Dr. J. M. Messer of Lebanca, Pa. Instead of using several tasks, one to each principal branch, he places a single strong pole against the trunk of the tree. The lower and of the pole, if desired, may be sunk a few inches in the soil, for additional apport, but usually it will be found unfacient to source it to the trunk by come of atraw bands, or other tie that will not brain the back. The pole being secured, the throughing branches are selected by meson of the made fact to it. Fr. Messes utages that this method of trying up the branches of overlanded trees is associately as full in aborns, the support being occurred, and one actual than where several proper are American Agriculturist.]

## STRONG FACTS!

MEDICAL

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am revaining strength dally, and I am regaining strength daily, and I I cannot say too much in praise of it. Mrs. Mary E. Brassman, 273 Prestmanst.

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Suffering from kidney disease, from which I could get no relief, I tried Brown's Iron Bitters, which cured me completely. A child of mine, recovering from scarlet fever, had no appetite and did not seem to be able to eat at all. I gave him Iron Bitters with the huppiest results. Bitters with the happiest results.

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Heart Disease. Vine St., Harrisburg, Pa.

Dec. 2, 1881.

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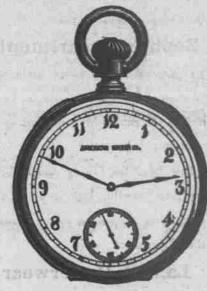
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